ILLUSTRATIONS

OF

HIMALAYAN PLANTS.

LONDON:

LOVELL REEVE, 5, HENRIETTA STREET, COVENT GARDEN.

1855.

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ILLUSTRATIONS
of
HIMALAYAN PLANTS

CHIEFLY SELECTED FROM DRAWINGS MADE FOR THE LATE

J. F. Cathcart Esq^re^

of the Bengal Civil Service.

THE DESCRIPTIONS AND ANALYSES BY

J. D. HOOKER M. D., F. R. S.

THE PLATES EXECUTED BY

W. H. FITCH.

Cathcartia villosa.

Fitch del. et lith.

Vincent Brooks Imp.

TO

THE HONOURABLE SIR JAMES W. COLVILE, KNT.,

PUISNE JUDGE IN THE SUPREME COURT OF CALCUTTA, ETC.,

PRESIDENT OF THE ASIATIC SOCIETY OF BENGAL,

AND

THE HONOURABLE SIR LAURENCE PEEL, KNT.,

CHIEF JUDGE IN THE SUPREME COURT OF CALCUTTA, ETC.,

PRESIDENT OF THE AGRI-HORTICULTURAL SOCIETY OF INDIA,

This Work is Dedicated,

IN ACKNOWLEDGMENT OF THEIR EMINENT SERVICES IN PROMOTING THE DIFFUSION OF SCIENCE AND OF HORTICULTURE IN INDIA,

BY THEIR FAITHFUL AND OBLIGED FRIEND,

JOSEPH D. HOOKER.

Royal Gardens, Kew,
June 30, 1855.

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INTRODUCTION.

I HAVE had a double object in publishing the present Work: one is to pay such a tribute to the memory of my friend, the late Mr. Cathcart, as should ensure the association of his name with the progress of Indian Botany; the other, to record the services he has rendered to that science by having caused a magnificent series of coloured drawings of Himalayan plants to be made in a previously almost unknown part of that mountain-range, and which since his death has been presented, through me, to the Royal Gardens of Kew, by his sister, Miss Cathcart, of Alloway.

These objects, it appeared to myself and to Mr. Cathcart's friends, would be best attained by publishing a limited series of the drawings, in such a form as should convey to the patrons of Botany and Horticulture in this country and in India some idea of the beauty and interest of that Flora to whose illustration Mr. Cathcart so zealously and liberally devoted his time and means. In carrying out these views, I have been so fortunate as to secure the services of Mr. Fitch, who has redrawn all the Plates, availing himself of my preserved specimens and analyses, and, by his own unrivalled skill in seizing the natural characters of plants, has corrected the stiffness and want of botanical knowledge displayed by the native artists who executed most of the originals.

I have endeavoured to choose such subjects as combine scientific interest with remarkable beauty in form or colour, or some other qualification that would render them eminently worthy of cultivation in England, and can only regret that I am obliged to limit myself to so small a selection; the drawings in question, of which there are nearly one thousand, affording ample materials for a large series of equal beauty and novelty with those now published. To make this volume a better illustration of a mountain Flora, I have added a few figures of alpine plants which were found at greater elevations than Mr. Cathcart was enabled to visit, and these are reproduced by Mr. Fitch from drawings of my own.

Mr. Cathcart was an ardent amateur, a man of a highly cultivated mind; naturally of a retiring disposition, he loved science for its own sake; and the hope that the fruits of his labours would benefit others as much as the prosecution of them gratified his tastes for what was curious and beautiful in nature, was the mainspring of his actions. His zeal was singularly unobtrusive, so that few even of the cultivators of science in India were aware of the extent of his exertions: his pursuits were, however, well known to a wide circle

of friends in that country, by whom he was held in high esteem, and who, though they might not share his tastes, could appreciate his devotion to them. To such, a brief notice of his life and labours will, I am assured, be acceptable, no less than to all men of science, who, whether or not they may labour in the same country and devote themselves to the same pursuit, look for some record of a man whose services will be deservedly praised so long as Botany is cultivated. I may add, too, that I hope Mr. Cathcart's example will yet find many followers amongst the members of that branch of the service to which he was so long attached,—a branch of which all the members have the means, and all, at one period or other of their career, the time, to devote to the advancement of some department of science, whether as amateurs or as students.

The late James F. Cathcart was the youngest child of the Honourable David Cathcart, of Alloway, Judge in the Supreme Court of Session and Justiciary of Scotland; he was born at Edinburgh, 19th February, 1802, and educated at the High School of that city. In 1818 he was sent to Holland with a brother, an LL.D. of the University of Leyden, at the famous Botanic Garden of which ancient seat of learning he imbibed his first love of Botany. On his return to Scotland he met with the warmest encouragement from his maternal grandfather, Dr. Mure, a botanist of considerable attainments, residing in Ayrshire, in whose house young Cathcart found an excellent Hortus Siccus and botanical library. His time was passed partly in Ayrshire and partly at Edinburgh, where he availed himself of the lectures of Dr. Jamieson, the Professor of Natural History, and Dr. Rutherford, the Professor of Botany.

After being appointed to the Civil Service, Mr. Cathcart passed through the usual course of studies at Hayleybury; and before leaving for Calcutta in 1822 he spent some time in Paris, chiefly pursuing his favourite science at the Jardin des Plantes.

In India Mr. Cathcart devoted all his hours of relaxation to the study of plants, birds, and insects, observing diligently, training his native servants to collect, and sending seeds home to his friends in exchange for books. His health, however, never robust, soon gave way, and he was early obliged to repair to the Cape of Good Hope, on sick leave. In 1833 he took advantage of his three years' furlough to return to Europe, bringing with him a fine Hortus Siccus, which he presented to the Royal Botanic Gardens of Edinburgh. Natural History still occupied him in his native country, and he devoted himself with peculiar pleasure to a re-examination of the woods, glens, and mountains of the south of Scotland. In 1835 he travelled in France, Switzerland, and Italy, spending the winter of 1835-6 in Rome, shortly after which he returned to Bengal. Here his health quickly failed him, and after a short visit to Dorjiling, he repaired a second time to the Cape of Good Hope (about the year 1839), where he remained nearly a year, diligently collecting minerals and plants.

Towards the close of his long Indian career, Mr. Cathcart's health gave way a third time, and he obtained leave to spend the last few months of his period of service at Dorjiling, intending to stay there for a year or more, if the climate suited him. His main object in doing this was to study at leisure the rich and varied flora of that then almost unknown portion of the Himalaya, and in the hope (as he afterwards told me) of forwarding my views, by employing his artists in illustrating the botany of that country, which he knew I was then exploring.

I shall never forget the pleasure our first meeting afforded us. It was in the forests of the outer range of mountains, on his arrival; he was toiling up the steep ascent to Dorjiling, walking beside his pony, himself and his servant laden with flowering plants and ferns, as I was descending on an excursion to the Terai, at the foot of the mountains. Our conference was very brief, but it was an earnest of many longer ones. On my return to Dorjiling a few weeks afterwards, I found Mr. Cathcart occupying a large house, surrounded by a broad verandah, from which baskets of Orchids, etc., were suspended, and on the floor of which living plants of all kinds were piled in profusion. He had already established a corps of Lepcha collectors, who scoured the neighbouring forests, descending to 2000 feet, and ascending to 8000, bringing every plant that was to be found in flower; and in his house were two artists busily at work. He told me his plans, and invited my co-operation; he intended to procure more artists, the best that could be obtained, from Calcutta, especially those skilled ones, who had been trained under Wallich and Griffith in the Botanic Garden, and to draw every plant of interest that he or I could procure. Knowing that a Flora of the Himalaya was a work which I contemplated, he most liberally offered me the use of all the drawings on my return to England, and expressed a wish that I should direct his artists to the plants best worth figuring, and instruct them in perspective, and in drawing the microscopic details, the points in which native artists are mainly deficient.

Mr. Cathcart continued to reside at Dorjiling and in the neighbourhood till the winter of 1850; during the latter part of the time he kept as many as six artists steadily employed, and accumulated a collection of nearly one thousand drawings. For the last year he resided at Leebong, a singularly beautiful spot, about 1000 feet below Dorjiling and 6000 feet above the sea. His house occupied a mountain spur that projected from that on which Dorjiling is built, overhanging the steep forest-clad gorge of the Great Runjeet river, 5000 feet below, and descending in steep jungly slopes on either hand. Through these forests he had caused the natives to cut paths, directing their operations with all the taste and judgment of an experienced and skilful landscape gardener. These openings led through the tangled jungle, and wound amongst tall trunks of giant timber-trees, which were clothed with climbing Palms, wild Vines, Peppers, *Pothos*, *Hodgsonia*, and *Ipomœa*, and laden with masses of Orchids and Ferns, suddenly emerging on eminences commanding views of two hundred miles of snowy mountains, rising range behind range in dazzling beauty, and again descending by zigzags to cascades fringed with Ferns and Mosses, and leading thence along the margins of rippling streams, overshadowed by Tree-Ferns, Bamboos, and wild Plantains.

In such scenes Mr. Cathcart passed nearly two years, spending the whole day, when fine, in the open air. His health not permitting of his taking strong exercise, his explorations were confined to the paths along which he could ride his pony; and his habit was to have his meals prepared for him at some favourite spot in the forest, where he might tranquilly admire the beauties of the surrounding vegetation and the grandeur of the distant prospect, and at which his collectors would rendezvous with baskets full of rare and beautiful plants, which were poured out on the grass at his feet, and selections made from them for the artists.

In February, 1851, on my own return to Calcutta, previous to embarking for England, I found Mr.

Cathcart residing at Garden Reach, opposite the Botanic Gardens. He had quitted Dorjiling a few weeks before, and the period of his service having expired, he proposed to leave India in the following month, sending the drawings to me, but spending some months on the Continent himself. He desired me to retain them till his arrival, when he proposed to expend £1000 on illustrating a work similar to the Sikkim-Himalaya Rhododendrons, and to distribute it to the principal botanists and scientific establishments in Europe, and for this work I had offered to contribute the descriptive matter from my own manuscripts and collections.

On the 7th of February I saw my friend for the last time; he signalled a happy voyage to me from the balcony of his house, as the steamer rapidly bore me down the Hoogly on my homeward way. He followed me to Europe, but not to England; for he died suddenly of apoplexy, at Lausanne, in Switzerland, on the 8th of July, 1851, in his forty-ninth year.

It remains to record my obligations to my late friend's family for that liberal assistance without which I could not have undertaken the present work; and to the many friends who have come forward as subscribers to it. Science is not yet self-supporting; it requires the countenance of amateurs no less than the severe studies of proficients to ensure its progress. Works like the present must appeal to the lovers of art and horticulture, the latter of whom are mainly indebted to the labours of Botanists for the objects that afford them their greatest and most rational delight. Innumerable are the opportunities enjoyed by the cultivators of Horticulture and Botany of mutually aiding one another: indeed, neither pursuit can exist alone, and still less can they be advanced independently. It has been one of my purest sources of gratification to find, that the fruits of my own Himalayan journeys (in the prosecution of which abstract science was my primary object) have been both appreciated by the lovers of gardening, and have afforded to Mr. Fitch the means of executing, in the "Illustrations of Sikkim Rhododendrons," a series of drawings that have been justly pronounced as of unrivalled excellence in an artistic point of view.

No pains have been spared by the same incomparable Botanical Artist to render the Plates now published worthy of imitation, as combining scientific accuracy in the truthful representation of details with graceful grouping in perspective, judgment in shading and colouring, and freedom with delicacy in drawing upon stone.

EXPLANATION

OF THE

PLANTS FIGURED ON THE TITLE-PAGE.

The following Sikkim-Himalayan plants have been reduced and grouped by Mr. Fitch, chiefly from Mr. Cathcart's drawings.

1. In the centre of the title-page, *Cathcartia villosa.*
2. In the centre of the group of flowers, two flowers of *Magnolia Campbellii.*

To the left :—

3. A stem of the mountain Bamboo, on the left-hand side of the title-page.
4. *Codonopsis inflata,* climbing round the middle part of the Bamboo stem.
5. *Dactylicapnos thalictrifolia* (in fruit) round the lower part of the Bamboo stem.
6. *Meconopsis Nepalensis* (yellow panicle of flowers), next to the Bamboo leaves.
7. *Arisæma,* species undescribed; purple-hooded Arum, with two trifoliolate leaves; beneath the *Meconopsis.*
8. *Rubus rosæfolius,* red fruit, below the left-hand *Arisæma* leaf.
9. *Rubus calycinus,* red fruit, below 7, and across the bottom of the Bamboo stem.
10. *Rhododendron Dalhousiæ* (white), to the left of the *Magnolia Campbellii* (2).
11. *Rhododendron Hodgsoni,* to the right of 9.
12. *Rhododendron fulgens,* to the left of 9, and immediately above the *Rubus* (8).
13. *Rhododendron æruginosum,* a few flowers above the head of *R. fulgens.*
14. *Vaccinium salignum,* below *R. Dalhousiæ.*
15. *Calanthe,* species?, leaf and pale purple flower, to the right of 14.
16. *Cœlogyne cristata,* to the right of 15.
17. *Cœlogyne ocellata,* a single flower, above 16, and a little to the right of it.
18. *Cœlogyne Hookeriana,* two purplish flowers and leaves, below the *Magnolia* petals.

To the right of the Magnolia :—

19. A stem of a mountain Rattan cane, *Calamus,* on the right-hand side of the title-page.
20. Purple-flowered *Ipomœa* (species unknown), elevation 5-6000 feet, and
21. *Hodgsonia heteroclita,* both climbing round the Palm stem.
22. *Meconopsis simplicifolia* (blue), between the leaves and flowers of the *Hodgsonia.*
23. *Rhododendron Aucklandii,* large white-flowered, to the right of the *Magnolia.*
24. *Rhododendron Thomsoni,* var. *candelabrum,* between the *Magnolia* and *R. Aucklandii* (beneath the word "villosa").
25. *Rhododendron Thomsoni* (scarlet), between *R. Aucklandii* and the *Hodgsonia* leaf.
26. *Rubus flavus,* "yellow Raspberry," below *Rhododendron Thomsoni.*
27. *Dactylicapnos thalictrifolia,* in flower and fruit (see also 4), at the extreme right hand, lower corner.
28. *Æschynanthus Peelii,* to right of *Rhododendron Aucklandii.*
29. *Calanthe veratrifolia* (pale lilac), below *Rhododendron Aucklandii.*
30. *Cœlogyne præcox* (purple), below 27.

1.

2.

3.

J.D.H. del.. W.Fitch, lith.

Vincent Brooks imp.

HODGSONIA HETEROCLITA. Hook.f. & Thoms.

MALE PLANT

PLATE I.

HODGSONIA HETEROCLITA, *H.f. et T.*

Nat. Ord. Cucurbitaceæ.

Char. Gen.—Fl. Mas. *Calycis* tubus elongatus; limbus pateriformis, 5-gonus. *Petala* 5, basi calycis limbo et inter se connata, patentia, apice truncata, fimbriato-lobata; lobis longissimis, tortis, pendulis. *Stamina* 5, triadelpha. *Antheræ* monadelphæ; loculis linearibus, contortis.—Fl. Fœm. *Calyx* maris, sed basi ovario sphærico adhærens. *Corolla* maris. *Ovarium* 1-loculare. *Placentæ* 3, parietales, basi utrinque 2-ovulatæ. *Stylus* elongatus, tubum calycis æquans. *Stigma* 3-lobum. *Bacca* depresso-globosa, sulcata, pulpa dura repleta. *Semina* per paria in nuces 6 arcte accreta, altero minore plerumque effœto. *Testa* lignosa, reticulatim sulcata. *Endopleura* crassissima, suberosa. *Embryo* exalbuminosus. *Cotyledones* magni, plani; *radicula* brevis; *plumula* lobata.—Caulis *alte scandens, ramosus.* Folia *alterna, sempervirentia, coriacea, palmatiloba.* Flores *magni, extus rufo-brunnei, velutini v. puberuli, intus straminei, villosi:* masculi *spicati, basi bracteati:* fœminei *axillares, plerumque solitarii.* Petioli *elongati.* Cirrhi *laterales, 2–5-fidi.*

Hodgsonia heteroclita (*Hook. fil. et Thoms. in Proceedings of the Linnean Society, No. LIV. Nov.* 1853); foliis 3–5-lobis glaberrimis, calycis lobis dorso glandula cornea, petalis obcuneatis fimbriis longissimis tortis, bacca brunnea velutina, seminibus oblongis testa profunde reticulatim sulcata.—Trichosanthes heteroclita, *Roxb. Fl. Ind. v.* 3. *p.* 705; *Wall. Cat. No.* 6684. T. grandiflora, *Wall. Cat. No.* 6685, *non Blume.*

Hab. In sylvis densis montium inferiorum Sikkim-Himalayæ, ad alt. 5500 ped. ascendens; Assam, mont. Khasia; Silhet; Chittagong; Penang; Java? *Fl.* May, June.

This magnificent plant is one of the most curious and beautiful of the whole natural family to which it belongs, and was therefore selected by Dr. Thomson and myself to bear the name of B. H. Hodgson, Esq., F.L.S., of Dorjiling, in the Sikkim-Himalaya, a gentleman whose scientific services in the Himalaya of Nipal and Sikkim justly merit this honour, and in whose hospitable residence my examination of this splendid plant was conducted.

Hodgsonia is very common in many parts of Eastern Bengal, but has not hitherto been cultivated in England; it once flourished in the Calcutta Botanic Gardens, but has long since been lost there. Its geographical distribution is very extensive, as it appears to range from almost the level of the sea in the island of Penang, lat. 6° N., to 5000 feet in the Sikkim-Himalaya, lat. 27° N.; at the latter elevation, however, inhabiting the deepest and most sheltered valleys of the outer range. It is probably also a native of Java, for it agrees tolerably with the descriptions of several species of *Trichosanthes* described by Dr. Blume. The stems are slender lianas, frequently one hundred feet long; they climb the forest trees, and their branching ends, matted together, and covered with leaves, sometimes form dense hanging screens of bright green foliage. The large flowers appear in May, and are very deciduous, the males falling wholly away, and the females breaking off just above the ovary; these flowers may often be seen strewing the ground in abundance in the forest, when the plant itself cannot be recognized amidst the canopy of vegetation above the traveller's head. The great melon-like fruit, called "Kathior-pot" by the Lepchas, ripens in autumn and winter. Its coarse, hard, green pulp exudes a gummy fluid in great abundance, but is austere and un-

eatable. The embryo is white, of the texture of an almond, and much esteemed, though it has but little flavour.

Some of the botanical characters of this plant are most remarkable. The flower in all respects resembles that of a *Trichosanthes*, but the ovary and fruit wholly differ from that genus, and ally it more to the curious East African genus *Telfairia*. The placentæ are decidedly marginal, and the two collateral ovules, at the base of each side of each placenta, contract an adhesion, and together form only one seed with two cells, and often two embryos, though one is frequently imperfect. A further botanical account of it will be found in the Proceedings of the Linnean Society of London.

The name *heteroclita* was given by Dr. Roxburgh to this plant (which he, not being acquainted with the fruit, supposed to belong to *Trichosanthes*), in allusion to its differing considerably from the genus to which he referred it; we have retained the name, because its fruit proves it to be even more heteroclite, or anomalous, as regards the natural family to which it belongs.

This plant, when introduced into England, will require an almost tropical heat and damp in summer, but not in winter, when it ought to be kept more cool and dry.

PLATE I. Male plant of *Hodgsonia heteroclita*, of the natural size. Fig. 1. Longitudinal section of the calyx-tube, showing the anthers, etc. Fig. 2. Ovary of a female flower, with a longitudinal section of its calyx-tube, showing the style and stigmata. Fig. 3. Transverse section of an ovary, showing the six pairs of parietal ovules:—*all magnified.*

I.D.H.del.. W.Fitch.lith.

Vincent Brooks imp.

HODGSONIA HETEROCLITA. Hook.fil.et Thoms.

FEMALE PLANT.

PLATE II.

HODGSONIA HETEROCLITA, *H.f. et T.*

(FEMALE PLANT.)

See Description opposite Plate I.

J.D.H del. W.Fitch lith.

Vincent Brooks Imp

HODGSONIA HETEROCLITA, H.f. et T.

PLATE III.

HODGSONIA HETEROCLITA, *H.f. et T.*

(FRUIT.)

See Description opposite Plate I.

2
3
4
1

PLATE IV.

MAGNOLIA CAMPBELLII, *H.f. et T.*

(FLOWERING PLANT.)

Nat. Ord. MAGNOLIACEÆ.

Arbor excelsa, foliis ovalibus vel ovatis utrinque glaberrimis vel subtus albo-sericeis, floribus ante folia enatis maximis, spathis dense fusco-pilosis, petalis 9–12, carpellis obtusis.—*Hook. fil. et Thoms. Flora Indica, v.* 1. *p.* 77.

HAB. In sylvis densis Himalayæ exterioris, alt. 8–10,000 ped.: Sikkim, Bhotan. *Fl.* Aprili.

This superb tree, which forms so conspicuous a feature in the scenery and vegetation of Dorjiling, was chosen by Dr. Thomson and myself to commemorate the eminent services of our friend Dr. Campbell, Resident at Dorjiling, in connection with the rise and progress of that important Sanatarium, as also his many contributions to our knowledge of the geography and natural productions, arts, manufactures, and races of the Nipal and Sikkim Himalaya.

The *Magnolia Campbellii* was discovered by Dr. Griffith in Bhotan; it is a large forest-tree, abounding on the outer ranges of Sikkim, at elevations of 8-10,000 feet, appearing on the road above Pacheem, and thence ascending to the top of Sinchul, 8000 feet, and Tonglo, 10,000 feet; though occasionally seen on the central ranges at the same elevations, it is much less frequent. The trunk is straight, often eighty feet high and twelve to twenty in girth, covered with black bark; the wood is soft and almost useless. The flowers are produced abundantly in April, at the end of all the branches, when the tree is as yet perfectly leafless; they vary from white to deep rose-colour, or almost crimson, and in size from six to ten inches; the scent is faint. In May the tree is in full leaf, and the fruit ripens in October, when a few small, and often deformed, flowers are sometimes produced. The flowering branch drawn in Mr. Cathcart's collection is nearly twice as large as that represented here. Young plants have the leaves perfectly glabrous; those of older trees are more or less silky on the under surface.

There are two other species of this genus in India; one (*M. globosa*, H.f. et T.) has hitherto only been found in the interior valleys of Sikkim, where it inhabits the skirts of woods, at 9-10,000 feet elevation; it is a small, also deciduous-leaved tree, with globose flowers, snow-white, and as large as a small fist, which appear with the leaves in June, and are very sweet-scented. It is closely allied to the Japanese *M. conspicua* of our gardens. The third Indian species, *M. sphenocarpa*, Roxburgh (Coromandel Plants, vol. iii. pl. 266), is a native of Chittagong, the Khasia mountains, and Nipal, where it inhabits subtropical valleys. The *M. Campbellii* and *globosa* would no doubt prove hardy in England, but *M. sphenocarpa* will require an almost tropical heat.

PLATE IV. Flowering specimen of *Magnolia Campbellii*. Fig. 1. Flower with the perianth removed, showing the stamens and spike of ovaries. 2. Stamens. 3. Stigma:—*magnified.*

W.Fitch del et lith. J.D.Hanal.

Hanhart Bros as Imp

MAGNOLIA CAMPBELLII , H.f & T.

PLATE V.

MAGNOLIA CAMPBELLII, *H.f. et T.*

(FRUITING PLANT IN FOLIAGE.)

See Description opposite Plate IV.

PLATE V. represents a branch with leaves and ripe fruit; behind is an old leaf; to the left, two full-grown trees, sixty to ninety feet high, in leaf. Fig. 1. Seeds, *of the natural size.* 2. A seed. 3. Vertical section of the testa of the seed with its outer fleshy covering removed, showing inside the endopleura, containing albumen and embryo. 4, 5. Vertical sections of seed, showing the red, fleshy, outer layer of testa, the black crustaceous coat of the same, the albumen, and minute embryo. 6. Embryo:—*all magnified.*

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W.Fitch del.et lith. J.D.H.anal

Vincent Brooks Imp

TALAUMA HODGSONI, H.f.&T.

PLATE VI.

TALAUMA HODGSONI, *H.f. et T.*

Nat. Ord. MAGNOLIACEÆ.

Arbor mediocris, foliis obovato-oblongis coriaceis glabris margine subsinuatis, floribus terminalibus solitariis, sepalis 3 crassis, petalis 6 interioribus minoribus, fructu magno, carpellis subtetragonis argute rostratis diametro transversali longitudinalem excedente, rachi profunde excavata, foveolis rotundatis.—*Hook. fil. et Thoms. Flora Indica, v.* 1. *p.* 74.

HAB. In sylvis densis Himalayæ exterioris, regione subtropica: Sikkim, alt. 3–5000 ped. *Fl.* April.

This is not an uncommon plant in the Sikkim forests, as at Khersiong and below Leebong, where it grows close to the road, forming a small tree, twenty to forty feet high, flowering in April, and always densely clothed with its large, handsome, coriaceous, evergreen leaves, which attain a very great size in young plants. The flowers are very fragrant and aromatic; though they do not expand much, they are exceedingly handsome, from the rich plum-bloom on the purple outer sepals, contrasting with the ivory whiteness of the inner ones; all the pieces of the flower are thick, hard, and fleshy. The wood is very soft and worthless.

Talauma Hodgsoni flourishes in a stiff clay soil, as do almost all the Himalayan *Magnoliaceæ*, and would require to be grown in a conservatory heated in winter.

PLATE VI. Flowering branch of *Talauma Hodgsoni*, with a full-grown leaf of a young tree behind, *of the natural size.* Fig. 1. Stamens and column of ovaria. 2. Stamen. 3. Transverse section of stamen. 4. Pollen. 5. Ovary. 6. Longitudinal section of ovary:—*all magnified.* 7. Ripe fruit. 8. The same with most of the carpels removed, showing the woody alveolate axis and insertion of the seed. 9. Seeds:—*all of the natural size.* 10. Vertical, and 11, transverse sections of seeds. 12. Endopleura and albumen. 13. Portion of endopleura (*very highly magnified*). 14. Vertical section of albumen and embryo. 15, 16. Embryos:—*all magnified.*

W.Fitch lith. J.D.H.anal.

MICHELIA CATHCARTII, H.f.&T.

PLATE VII.

MICHELIA CATHCARTII, *H.f. et T.*

Nat. Ord. Magnoliaceæ.

Arbor excelsa, foliis oblongo-lanceolatis acuminatis utrinque secus costam pilosis cæterum glabris, floribus terminalibus amplis, sepalis cum petalis novem, staminibus gynœcium fere superantibus, carpellis dense spicatis.—*Hook. fil. et Thoms. Flora Indica, v.* 1. *p.* 79.

Hab. In sylvis Himalayæ orientalis exterioris, regione temperata: Sikkim, alt. 5–6000 ped. *Fl.* April.

This is a very common tree on the outer range of the Sikkim-Himalaya, from 5-6000 feet, beyond which elevation it rarely ascends. It is conspicuous in April from the abundance of blossoms with which in some years the branches are covered, appearing as if snowed upon; as is the case with its allies, however, the trees flower much more freely at some seasons than at others. The leaves are only partially shed in winter, the new ones being put forth during or immediately after flowering, in April and May. It has hitherto been found nowhere but in Sikkim, and bears the name of Mr. Cathcart, around whose residence at Leebong, near Dorjiling, some fine trees of it stood; these were about sixty feet high, and had straight trunks, and rather short branches. The wood is good, and used for household purposes by the Bengali carpenters, who give it the name of Champa, which is also commonly applied to several other species of *Magnoliaceæ*.

The *Michelia Cathcartii* is well adapted for a large conservatory, being almost an evergreen, and always leafy; it is not, however, so showy nor hardy as the *M. excelsa*, which is the common white-flowered species of Dorjiling, and is also found in Nipal and the Khasia mountains. *M. excelsa* forms a tree as lofty as *Magnolia Campbellii*, bears white fragrant flowers, four to five inches in diameter, and is almost leafless in winter; it would probably prove hardy in England. In the spring of 1849 it flowered so profusely when still almost leafless, that Sinchul mountain appeared for many days as if a snow-shower had fallen across a belt of 1000 feet in height, just below the summit. The other six Indian species of *Michelia* are chiefly tropical or subtropical trees.

Plate VII. Fig. 1. Stamens. 2. Pollen. 3. Gynœcium. 4. Carpel:—*all magnified.* 5. Ripe fruit:—*natural size.* 6, 7, 8. Seeds:—*natural size.* 9, 10. Longitudinal sections of seeds. 11. Section of albumen. 12. Embryo:—*all magnified.*

J.D.H. del. et anal. W. Fitch lith.

Vincent Brooks Imp.

MECONOPSIS SIMPLICIFOLIA, H. f. & T.

PLATE VIII.

MECONOPSIS SIMPLICIFOLIA, *H.f. et T.*

Nat. Ord. PAPAVERACEÆ.

Herba scaposa, tota patentim hispido-pilosa setis scapi decurvis, foliis omnibus radicalibus lanceolatis in petiolum angustatis, scapis 1-floris, floribus nutantibus violaceis, capsula lineari-clavata.—*Hook. fil. et Thoms. Flora Indica, v.* 1. *p.* 252. Papaver simplicifolium, *Don, Prodr. Flor. Nep. p.* 196; *Wall. Cat.* 8125.

HAB. In Himalaya alpina centrali et orientali; Nipalia ad Gossain-than, *Wallich;* Sikkim, alt. 12–14,000 ped. *Fl.* Mai. Jun.

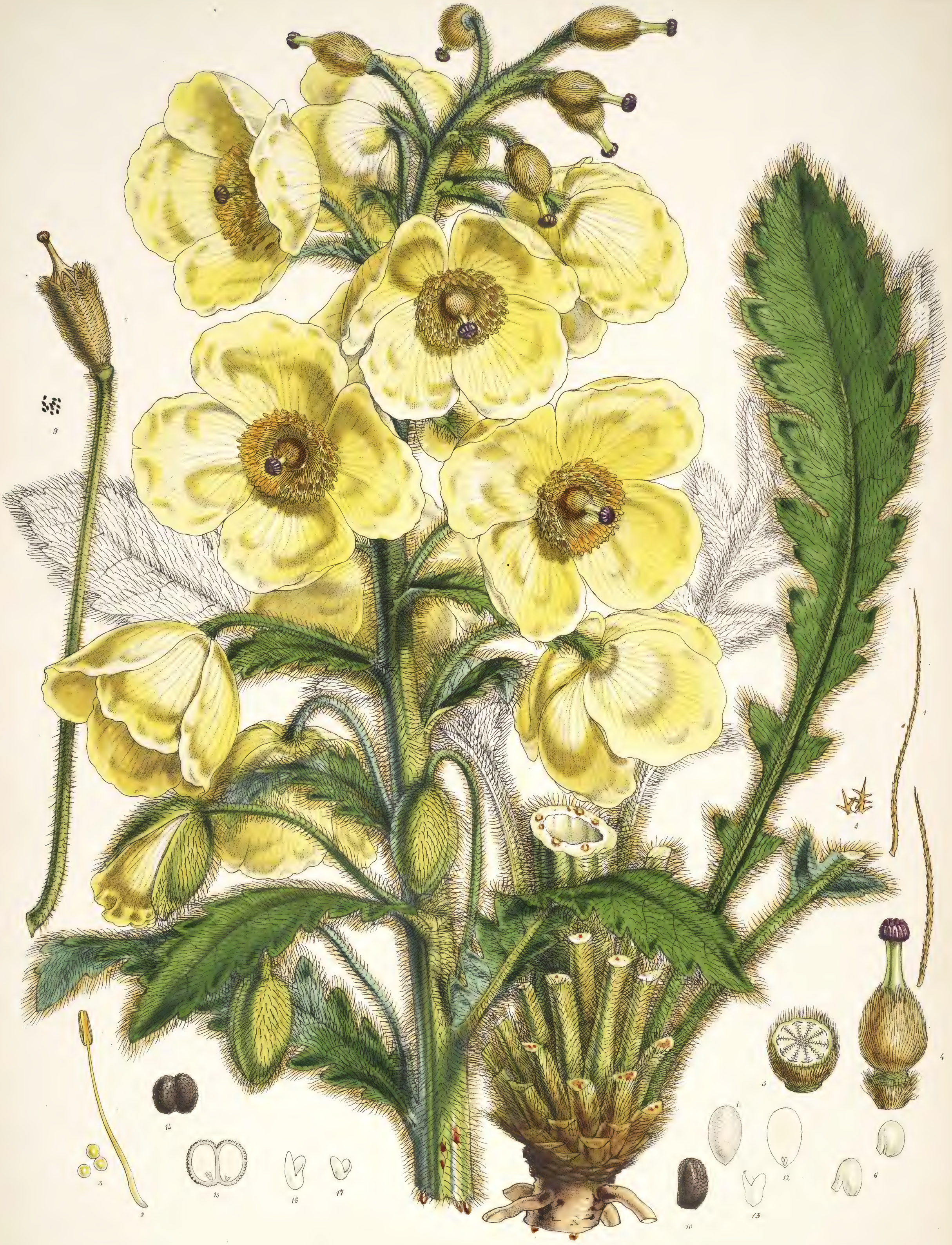
The present is the most beautiful and conspicuous of all the alpine flowers of Sikkim, if not of the whole Himalaya, and is very common in rocky and gravelly places, at 12,000 feet elevation and upwards, where it expands its delicate blossoms in May, exposed to the violent winds and snow-storms of those inhospitable regions. It was originally discovered by Dr. Wallich's collectors in Central Nipal, but has not been found further west in the Himalaya. The accompanying Plate is from a drawing of my own.

There are only two scapigerous species of *Meconopsis* in the Himalaya, the present and the *M. horridula*, H.f. et T. The latter has only been found in Sikkim; it is a smaller plant than that figured here, more densely covered with harsh prickles, which pierce the skin when the plant is handled, and has very many scapes, with smaller, paler purple flowers; it is one of the most alpine plants in the world, and I have gathered it at upwards of 17,000 feet elevation, where very little other vegetation was to be met with.

All the Himalayan species of *Meconopsis* differ from the European Welsh Poppy (*M. Cambrica*) in having a much longer style, and would hence be referred by some authors to the American genus *Stylophorum*, Nutt.; but that genus is itself perhaps not really distinct from *Meconopsis*, and differs in the valves of the capsule dehiscing down to the base.

Meconopsis simplicifolia would no doubt succeed perfectly well in an open border or rockwork, provided it be kept damp and cool, and not exposed to too long-continued sunshine.

PLATE VIII. Fig. 1. Hairs of the scape. 2. Stamen. 3. Pollen. 4. Ovary. 5. Transverse section of ovary. 6. Ovule:—*all magnified.* 7. Ripe capsule. 8. Seeds:—*both natural size.* 9. Seed. 10. The same, with the testa removed. 11. Longitudinal section of albumen. 12. Embryo:—*all magnified.*



J.D.H. del. & anal. Walter lith.

Vincent Brooks imp.

MECONOPSIS NEPALENSIS. Wall.

PLATE IX.

MECONOPSIS NIPALENSIS, *DC.*

Nat. Ord. PAPAVERACEÆ.

Herba elata, robusta, tota setis patentibus crinita pubeque stellata sicco aurea obtecta, foliis caulinis sessilibus linearibus lineari-oblanceolatisve sinuato-lobatis, floribus aureis racemosis, pedicellis elongatis patentibus, capsula 8–10-valvi setis appressis pubeque stellata dense obsita.—*De Candolle, Prodromus, v.* 1. *p.* 121; *Hook. fil. et Thoms. Flora Indica, v.* 1. *p.* 253. Papaver paniculatum, *Don, Prod. Fl. Nep. p.* 197; *Wall. Cat.* 8123 A.

HAB. In sylvis Himalayæ centralis et orientalis temperatæ: Nipal ad Gosain-than, *Wallich;* Sikkim, alt. 10–11,000 ped. *Fl.* Mai. Jun.

This superb plant, when seen from a distance, resembles a small yellow Hollyhock. It was discovered by Dr. Wallich's collectors in Nipal, and I found it in the damp interior valleys of Sikkim, growing amidst a rank and luxuriant herbage on the skirts of Silver-Fir forests (*Abies Webbiana*), at 10-11,000 feet above the level of the sea. The accompanying figure is taken from a sketch of my own, of a specimen that was five feet high. The whole plant, like its congeners, abounds in a bright, chrome-yellow, fetid, acrid juice, and is considered to be highly poisonous.

There is another and scarcely less beautiful species of this genus in Sikkim, with a much more branched many-flowered panicle and smaller blue-purple flowers; it is found at equal elevations on the outer ranges of Sikkim and Nipal, and is abundant on the top of Tonglo; it is the *M. Wallichii*, Hook. (Bot. Mag. pl. 4668), and has flowered at Kew, from seeds which I sent to England in 1848. The present plant has also vegetated at Kew from seeds which I sent home in the following year, but has not flowered. Two other panicled species of *Meconopsis* inhabit the more Western Himalaya, the *M. aculeata*, Royle, and *M. robusta*, H.f. et T., both very beautiful plants, neither of which have hitherto been introduced into England. The single-flowered species I have alluded to under the previous Plate.

PLATE IX. Fig. 1. Hairs of the stem. 2. Stamen. 3. Pollen. 4. Ovary. 5. Transverse section of ovary. 6. Ovules:—*all magnified.* 7. Ripe capsule, *natural size;* and 8, hairs of its surface, *magnified.* 9. Seeds, *natural size.* 10. Seed. 11. The same with the testa removed. 12. Longitudinal section of albumen. 13. Embryo. 14. Seeds that have grown together. 15. Longitudinal section of the same. 16, 17. Deformed embryos from the same:—*all magnified.*

DECAISNEA INSIGNIS, H.f. & T.

W.Fitch. del. et lith. J.D.H. anal.

Vincent Brooks Imp.

PLATE X.

DECAISNEA INSIGNIS, *H.f. et T.*

Nat. Ord. LARDIZABALEÆ.

Char. Gen.—*Sepala* 6, subimbricata. *Petala* 0. *Stamina* in fl. masc. monadelpha, tubo cylindraceo, antheris oblongis, connectivo in processum subulatum producto; in hermaphroditis parva, antheris parvis, filamentis liberis brevibus. *Ovaria* 3, stylo disciformi obliqua. *Ovula* numerosa, placentis 2 filiformibus suturæ ventrali approximatis inserta, indefinita, anatropa. *Folliculi* pulpa repleti. *Semina* indefinita, biserialia, horizontalia, obovata, compressa; *testa* crustacea, nitida, lævi.—Frutex *erectus, subsimplex;* foliis *impari-pinnatis;* inflorescentia *racemosa, terminali.*

DECAISNEA insignis, *H.f. et T.;* foliis patentibus impari-pinnatis, petiolo basi articulato, foliolis 6–8-jugis oppositis ovato-lanceolatis acuminatis subtus glaucis, floribus polygamo-dioicis racemosis, sepalis lineari-lanceolatis, folliculis carnosis cylindricis recurvis.—*Hook. fil. et Thoms. in Linn. Soc. Proc.* 1854, *et in Flora Indica, v.* 1. *p.* 213.

HAB. In Himalaya orientali interiore, regione temperata: Sikkim et Bhotan, alt. 6–10,000 ped. *Fl.* Mai.; *fr.* Oct.

The genus *Decaisnea* is on many accounts one of the most remarkable in the Himalaya mountains, for it belongs to a very limited and peculiar Natural Order, of which all the other known species are climbing plants, and it differs in other and more important characters from its allies. It inhabits wooded valleys in the central regions of the Himalaya, and has not hitherto been found near Dorjiling. I gathered it first in the Lachen and Lachoong valleys, at elevations of 7-8000 feet; and afterwards at Chola, where it ascends to nearly 10,000. Its green flowers appear in May, and are scarcely visible amongst the leaves; the fruit, on the other hand, which ripens in October, is very conspicuous and handsome, of a pale yellow colour, and full of a white juicy pulp, that is very sweet and pleasant; its fruit is eagerly sought after by the Lepchas, who call the plant "Nomorchi," and it is the "Loodooma" of the natives of Bhotan.

Dr. Griffith was the discoverer of this plant, which he called *Slackia* in his manuscript journals (Itinerary Notes, p. 187), after an eminent microscopical observer; but before his death he transferred that name to a genus of Palms. Dr. Thomson and I have dedicated it to our friend Professor Decaisne, of Paris, one of the most learned botanists of the present day, and the author of a monograph of the natural family to which this plant belongs, which is a model of sagacity in botanical investigation. *Decaisnea* is well worthy of cultivation in England, for the sake of the fruit alone; it would require protection from the spring frosts, but will no doubt prove otherwise hardy.

Many of the botanical peculiarities of *Decaisnea* are extremely curious. Such are especially the erect habit, and the pinnated leaves jointed at the base of each pair of leaflets, as in the pinnate Berberries. The pith is very large, in which respect, as in habit and general appearance, it much resembles an Araliaceous plant. The ovules, instead of growing from the surface of the cavity of the ovary, as in the allied Himalayan genus *Hollböllia*, are confined to two placentæ near the ventral suture, and instead of being orthotropous and imbedded in cavities of the fleshy ovary, they are superficial and anatropous. As the

fruit ripens, a dense, firm, transparent pulp is developed from all the inner surface of the fruit, supplied with vessels from the carpel; this pulp closely invests the seeds, but does not form an organic adhesion with them, and a cavity is also left in the axis of the carpel.

The fruit of an allied and abundant Himalayan plant is also eaten in Sikkim, the *Hollböllia latifolia*, Wall.; it is the "Kole-pot" of the Lepchas, and has been long known in English gardens under the name of *Stauntonia latifolia;* it is not nearly so palatable a fruit as that of *Decaisnea*, being mealy and insipid.

PLATE X. Fig. 1. Diminished sketch of *Decaisnea* removed from the dense forests in which it grows. 2. Flowers. 3. Sepal. 4. Stamens of male flower. 5. Stamen of hermaphrodite flower. 6. Pollen. 7. Stamens and ovaria of hermaphrodite flower. 8. Carpel. 9. Longitudinal section of carpel. 10. Transverse section of carpel. 11, 12. Ovules:—*all magnified.* 13. Transverse section of ripe carpel, *natural size.* 14, 15. Seeds, *natural size.* 16. Seed with the testa removed. 17. Longitudinal section of albumen. 18. Embryo:—*all magnified.*

W Fitch del. et lith.

DUABANGA SONNERATIOIDES, Kurz.

PLATE XI.

DUABANGA SONNERATIOIDES, *Ham.*

Nat. Ord. Lythrarieæ.

Arbor elata, ramis horizontalibus verticillatis, ramulis tetragonis petiolos communes mentientibus, foliis oppositis distichis subsessilibus patentibus oblongis acuminatis basi cordatis integerrimis subtus glaucescentibus venosis, paniculis axillaribus terminalibusque, pedunculis teretibus, floribus amplis albis, calyce crasso 6-fido segmentis 6 acutis, petalis obovatis unguiculatis undulatis caducis, filamentis subulatis, antheris curvis lineari-oblongis, stylo curvo, stigmate capitato lobato, capsula rotundata 6–8-valvi.

Duabanga sonneratioides, *Hamilton's Commentary on the 'Hortus Malabaricus' in Linn. Soc. Trans. v. 22. p.* 177. Lagerstrœmia grandiflora, *Roxb. Hort. Beng. p.* 38, *Flora Indica, v.* 2. *p.* 503; *De Candolle, Mem. Soc. Hist. Nat. Gen. ser.* 3. *v.* 2. *p.* 84, *Prodr. v.* 3. *p.* 93. Leptospartium, *Griff. MSS.*

Hab. In sylvis tropicis ad basin Himalayæ orientalis provinciarum Bhotan et Sikkim; in montibus Khasiæ, Chittagong, et Tenasserim. *Fl.* Aprili.

A very remarkable plant, forming, from its peculiarity of habit, a singular feature in its native forests. The trunk is erect, forty to eighty feet high, undivided, or sometimes forking from the base, and the lower limbs spread drooping from the trunk; these are long, slender, sparingly branched, and the branches are four-angled, loosely covered with large spreading leaves. Owing to the leaves being arranged in two ranks, the slender branches resemble petioles, bearing pinnæ of a compound leaf; the leaves are further often recurved, and are deep green above, and almost white beneath. The large blossoms expand in April, and exhale a rank fetid odour, something like asafœtida, when they first burst, but become inodorous before the petals drop. The stamens are all bent inwards in bud. The fruit is as large as a small apple, and is well described both by Hamilton and Roxburgh.

Duabanga was first made known by Dr. Roxburgh, who procured plants of it from Chittagong for the Botanic Garden at Calcutta, and prepared an excellent description, published after his death, in the 'Flora Indica;' it has also been fully described by Hamilton in his Commentary on the 'Hortus Malabaricus,' in the seventeenth volume of the Linnæan Transactions. The tree is called "Door" by the Lepchas, and will require stove heat in this country during the summer: in the winter, and previous to flowering, it should be kept much drier. The wood is valueless, white, and soft.

Plate XI. Fig. 1. Petal. 2. Stamen. 3. Pollen. 4. Flower, with portions of the calyx, the petals, and most of the stamens removed. 5. Transverse section of ovary. 6. Young fruit. 7. Half-ripe seed:—*all more or less magnified.*

W Fitch del. et lith. J D H anal

Vincent Brooks Imp.

AUCUBA HIMALAICA, H.f. & T.

PLATE XII.

AUCUBA HIMALAICA, *H.f. et T.*

Nat. Ord. Corneæ.

Frutex 5–7-pedalis, ramis ramulisque teretibus ultimis appresse pubescentibus, foliis lanceolatis longe acuminatis serratis v. subintegerrimis, junioribus appresse sericeis, paniculæ ramis ramulisque sericeo-pilosis, calycis limbo truncato, petalis ovatis subciliatis longe acuminatis, filamentis brevibus, bacca oblonga.

Hab. In sylvis densis Himalayæ orientalis temperatæ; Sikkim, alt. 7–10,000 ped. *Fl.* Mai.

The only hitherto described species of *Aucuba* is the well-known *A. Japonica* of our gardens, the variegated-leaved variety of which has been in cultivation in Europe for many years: of this the female plant alone is cultivated, the male never having been introduced into this country. For an account of the latter we are indebted to Siebold and Zuccarini, 'Flora of Japan,' where both sexes are well figured. In all important characters the Japan and Himalayan plants resemble one another very closely indeed, the only differences which I have been able to detect, and which I doubtfully regard as constant, being that the Himalayan species has considerably longer and narrower leaves, with longer narrower points, and long acuminate points to the petals. These characters, together with the immense geographical distance between the native localities of the two, have induced Dr. Thomson and myself to consider the present as distinct. It must not be overlooked, however, that these differences are only of degree; for though the acuminate points of the petals may be considered of more importance than the similar character of the leaves, these differences are analogous in each organ; and the petals being modified leaves, a character of the former is often found to be repeated in the latter. It is very possible that this *Aucuba* extends to the northward and eastward in Central Asia, along the lofty chain of snowy humid mountains which bound China on the west; and that specimens from the countries which are intermediate between Japan and Sikkim would be found to unite the characters of both species, and prove them to be varieties of one.

The *Aucuba Himalaica* is one of the many striking cases of botanical affinity between the temperate flora of the Himalaya, and especially of the Eastern Himalaya, and China and Japan, and which affinity is not shared by the flora of Europe; of this other instances are *Enkianthus*, *Skimmia*, *Camellia*, *Deutzia*, *Helwingia*, *Stachyurus*; besides *Panax*, *Hydrangea*, *Diclytra*, *Kadsura*, *Hollböllia*, *Magnolia*, *Sassafras*, and *Trillium*, which eight latter are also common to North America. All these genera become scarce in the Western Himalaya, few of them reaching Kashmir; whereas, on the other hand, many European trees and shrubs, not natives of China, Japan, and North America, are abundant in the Western Himalaya, few of which advance so far east as Sikkim.

The Himalayan *Aucuba* inhabits elevations of 7000-10,000 feet, but is only found on the outer wetter ranges of Sikkim, so that it would probably require protection from the spring frosts of England. It delights in very humid spots, where Mosses and Lichens hang from its branches.

PLATE XII. Fig. 1. Male flowers. 2. Petal. 3. Stamen. 4. Anther. 5. Pollen. 6. Female flower. 6. Hair from calyx. 7. Flower with petals removed. 8. Vertical section of ditto. 9, 10. Ovules. 11. Vertical section of fruit. 12. Seed with its funiculus, etc. 13. Transverse section of seed. 14. Longitudinal section of seed. 15. Embryo. 16. Albumen :—*all highly magnified.*

W Fitch del et lith

Vincent Brooks Imp.

BEGONIA DAVISII, H.f. & T.

PLATE XIII.

BEGONIA CATHCARTII, *H.f. et T.*

Nat. Ord. Begoniaceæ.

Caulescens, 1–2-pedalis, monoica, caulibus petiolis pedunculisque squamis ovatis acuminatis reflexis paleaceis, stipulis late ovato-oblongis eroso-dentatis reflexis, foliis alternis petiolatis oblique ovato-oblongis acuminatis basi profunde inæqualiter bilobo-cordatis grosse inæqualiter serratis lobulis serrulatis supra glaberrimis paleaceis vel nudis lucidis subtus secus costam nervosque primarios squamosis, pedunculis axillaribus unifloris supra medium bibracteolatis, bracteolis ovatis concavis, floribus amplis albis superioribus masculis, perianthii segmentis ovatis obtusis exterioribus dorso subsquamosis, staminibus perplurimis densis, stigmatibus bicruribus, ovario 3-alato 2-loculari paleaceo, placentis dissepimento adnatis lobulatis.

Hab. In sylvis densis Himalayæ orientalis temperatæ: Sikkim, alt. 6–8000 ped. *Fl.* temp. pluvioso.

This noble species is not uncommon in woods near Dorjiling, but I have never seen it abundantly, and seldom of so great a size as the specimen represented in the Plate. Like its congeners, it varies extremely in stature, becoming very dwarf and diminutive in all its parts in a dry soil and exposed situation. It appears to belong to *Platycentrum* of Klotzsch, according to that author's definition of the genera into which he divides *Begonia*.

Most of the Himalayan *Begonias*, of which there are about a dozen known species, are confined to the eastern parts of that mountain range, and are not abundant anywhere to the westward of Sikkim, where eight or ten species are found. In the Khasia mountains they are extremely abundant. The stems of many are eaten cooked, being pleasantly acid; and such are made into a sauce for pork, and other greasy meats, by the native inhabitants of Sikkim.

Begonia Cathcartii would no doubt succeed well in a cool, damp Fern-house, and prove a great acquisition. With the exception of the following (*B. gemmipara*), it is the most hardy of the Sikkim species.

Plate XIII. Fig. 1, 2, 3. Stamens. 4. Pollen. 5. Ovary and stigmata. 6. Transverse section of ovary:—*all magnified.*

W. Fitch del. et lith.

Vincent Brooks Imp.

BEGONIA GEMMIPARA, Hf. & T.

PLATE XIV.

BEGONIA GEMMIPARA, *H.f. et T.*

Nat. Ord. Begoniaceæ.

Caulescens, dioica, glaberrima, radice tuberosa, caule simplici, stipulis brevibus oblongis obtusis, foliis petiolatis ovatis triangulari-ovatis oblongisve varie inæqualiter palmatilobis subintegrisve pagina superiore interdum subpilosa basi cordato-bilobis, lobis acutis grosse irregulariter serratis nervis primariis palmatis, stipulis ad axillas gemmiferis, pedunculis axillaribus brevibus 1–2-floris supra medium bibracteatis, bracteis amplis orbiculatis concavis, perianthii segmentis orbiculatis obtusis concavis, filamentis brevibus basi in columnam brevem coadunatis, antheris obovatis truncatis, ovario 3-loculari 3-alato alis superne in cornua erecta obtusa dilatatis, placentis alte bifidis, stylis obcuneatis, stigmatibus truncatis bilobisve.

Hab. In sylvis densis Himalayæ orientalis temperatæ; Sikkim, alt. 7–10,000 ped. *Fl.* tempore pluvioso.

A very singular species, without much beauty to recommend it, but remarkable for the development of bodies in the axils of the leaves of both the male and female individuals, which are quite unlike any other organs of the plant, and whose exact nature I am unable to discover. I first found the species near Dorjiling, in the autumn of 1848, but it appeared to be rare, and some observations which I had begun upon the functions of the axillary bodies were left unfinished when I had to leave that station for the interior. I again found the same plant when travelling in the interior of Sikkim, in August, 1849, growing at the foot of Fir-trees (*Abies Smithiana* and *Brunoniana*), in the Lachoong valley, at 8-9000 feet elevation, but the specimens were much smaller than the Dorjiling ones, and the leaves covered with silver spots, like those of the common *B. argyrostigma*. In almost every individual a clavate, truncate, or wedge-shaped body grew close to the petiole of one or more of the leaves, or rather from the axil of one of the stipules; it consisted of a quadrate, club-shaped, fleshy mass, surrounded with imbricating orbicular bracts, and was divided at the top into four, eight, or twelve cup-shaped compartments, with much regularity. In these were seated a variable number (but generally four, or a multiple of four) of oblong, green, fleshy, terete bodies, or gemmules, with narrowed tapering pedicels, sunk into a common receptacle; each had two bracteolæ at its base, and a few minute terminal scales at the very apex. I examined very many of them microscopically, but found no contents beyond cellular tissue, full of chlorophyll grains; amongst Mr. Cathcart's drawings, however, there is a transverse section of one (fig. 9 of the accompanying Plate) with five enclosed cavities or bodies.

In the very many specimens that I examined, I found no material deviation from the above type of structure, and none at all that suggested any explanation of their nature or origin. Their position, being axillary to the stipule and not to the petiole, is curious, as is their being equally prevalent in the male and female individuals, and both in the large succulent specimens from the damp climate of Dorjiling, and in those from the much drier and more alpine woods of Lachoong, in the interior of the province. The tendency to a quaternary arrangement of the parts is also curious, and suggests their being more analogous to the male flower (which is always tetramerous) than to the female. The two bracteolæ at the base of each

of the contained ovoid bodies would further suggest the reference of these to modified flowers, and the scales at their summit to their being imperfect inferior ovaria, with undeveloped perianth and stigmata; but I can only offer these observations as rude analogies, nor, until their functions are discovered, is it probable that much light will be thrown on their relationship to other parts of the plant. I traced their growth from a very early stage, when the scales closed over the ovoid bodies, but at no period did I discover any point of structure that explained their origin or nature. Amongst the dried specimens I have found some with the female flowers monstrous; these have no inferior ovary, but two stigmata, which are dilated and excavated at the base, and bear numerous cellular papillæ, resembling imperfect and very deformed ovules scattered over the surface of the concavity, and attached to its margins. The petals are also sometimes deformed, and bear similar papillæ on their inner faces. These malformations appear to exhibit a tendency in the perianth to become inferior, or rather in the flowers to develop superior ovaria; but the membranous nature of the parts prevents their being satisfactorily analysed in specimens that have been dried.

The *Begoniæ* have probably a great tendency to become viviparous, as is the case with many other plants of very succulent tissues. Thus Von Martius describes (in the Transactions of the Royal Bavarian Society of Munich; see also Hook. Journ. Bot. iv. 206) a species under the name of *B. phyllomaniaca*, which develops thousands of leaflets on its stem and branches, and these, on being planted, become new individuals. This fact, however, seems analogous to the well-known property of *Bryophyllum* and other plants, and is of a totally different nature from that presented by *B. gemmipara*.

The *Begonia gemmipara* cannot be called an ornamental plant; I have nevertheless ventured to introduce it into this work, as being one of the most curious and anomalous that I met with in Mr. Cathcart's collection of drawings; and in point of interest and novelty it is well deserving the attention of every lover of plants.

PLATE XIV. Fig. 1. Male flower. 2. Stamens. 3. Female flower. 4. Ovary and styles. 5. Transverse section of ovary. 6. Gemmule from the axillary bodies. 7. Vertical section of ditto. 8. Very immature ditto. 9. Transverse section of ditto, from Mr. Cathcart's collection:—*all magnified.*

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W. Fitch del. et lith

Vincent Brooks Imp.

A, VACCINIUM SALIGNUM, H.f.&T.

B, VACCINIUM SERPENS, Wight.

PLATE XV. *A.*

VACCINIUM SALIGNUM, *H.f. et T.*

Nat. Ord. Vacciniaceæ.

Epiphyticum, glaberrimum, sempervirens, ramis teretibus foliosis, foliis undique insertis breviter petiolatis anguste ovato-lanceolatis longe acuminatis basi angustatis integerrimis coriaceis subtus glaucescentibus costa prominula marginibus sicco subrecurvis, racemis pendulis axillaribus et e ramis ortis, pedunculo communi 5–10-floro gracili, pedicellis gracilibus superne sensim incrassatis, calycis tubo urceolato obscure pentagono lobis brevibus subulatis, corolla tubuloso-campanulata elongata 5-gona angulis subincrassatis breviter 5-loba lobis ovatis acuminatis recurvis, filamentis brevibus dilatatis apice pubescentibus, antheris longissimis.

Hab. In sylvis densis temperatis et subtropicis Himalayæ orientalis: Sikkim et Bhotan, alt. 4–7000 ped. *Fl.* Aprili.

The genus *Vaccinium*, which is mostly represented in northern climates by deciduous-leaved shrubs with small flowers, assumes a very different habit and appearance in the tropical mountains of both the Old and New World. In the lower eastern Himalaya, Malay Peninsula, Java, and other of the Malayan islands, especially, there is an extensive section—to which the two species here figured belong—which could hardly be recognized as having much affinity with the Whortleberry of our moors. They are all epiphytical shrubs, having the lower part of the stem often swelling out into a prostrate trunk, as thick as the human arm or leg, and sending out branching fibrous roots that attach it to the limb of the tree upon which it grows. These trunks are soft and spongy internally, and are reservoirs of moisture and nutriment; they send out a few slender, generally pendulous branches, which bear often gorgeous flowers.

Botanists have endeavoured to separate these generically from the northern species of the genus, but the characters by which the extreme forms have been distinguished are found to be prevalent in such different degrees in the various species, that they have been abandoned by Dr. Wight, who has worked up the Indian species in his 'Icones Plantarum Indiæ Orientalis.' Dr. Klotzsch, of Berlin, however, takes a very different view of the value of these characters, and has distributed the Indian *Vaccinia* under five genera (Linnæa, vol. xxiv.). The present does not strictly agree with his characters of any of these, but from its affinity with *V. odontocerum*, Wight, it will probably be referred to *Caligula*.

It is a singular fact, that though the *Vaccinia* of this habit and character are so very prevalent from Nipal westward to the mountains of Bhotan and Khasia, and thence southward along those of the Malayan Peninsula to Java, they are wholly unknown in the peninsula of India, and in Ceylon, where, however, some of the terrestrial shrubby species grow. The leaves of the present species are used as a substitute for tea by the natives of Sikkim. It was discovered in Bhotan by Dr. Griffith.

Plate XV. *A.* Fig. 1. Pedicel, calyx, and style. 2. Stamen. 3. Tissue of the cell of the anther, with pollen-grains. 4. Tissue of tube of anther. 5. Transverse section of ovary. 6. Ovule:—*all magnified.*

PLATE XV. *B.*

VACCINIUM SERPENS, *Wight.*

Nat. Ord. VACCINIACEÆ.

Epiphyticum, dependens, sempervirens, totum foliis exceptis glanduloso-hispidum, ramis gracilibus, foliis parvis patulis subdistichis brevissime petiolatis ovatis acuminatis basi rotundatis supra medium serratis apice 2–3-cuspidatis glaberrimis convexis coriaceis enerviis costa obscura, floribus solitariis axillaribus pendulis, pedicellis foliis longioribus infra medium bibracteolatis, calycis tubo 5-alato lobis brevibus obtusis, corolla tubulosa pubescente subventricosa obscure 5-gona fauce contracta lobis brevibus recurvis, staminibus fere ut in *V. saligno.*

VACCINIUM serpens, *Wight, Ic. Plant. Ind. Or. t.* 1183.
PENTAPTERYGIUM serpens, *Klotzsch in Linnæa, v.* 24. *p.* 47.

HAB. In sylvis tropicis et temperatis Himalayæ orientalis: Bhotan et Sikkim, alt. 3–7000 ped. (*Fl.* Aprili, Maio.)

This is one of the most beautiful species of the splendid section of *Vaccinium* to which it belongs. It was discovered by Griffith in Bhotan, and found abundantly in Sikkim by Dr. Thomson and myself, inhabiting the limbs of lofty trees at various elevations between 3000 and 7000 feet elevation. It is one of the very few plants that inhabit both the tropical and temperate zones of the Himalaya, a peculiarity which is no doubt partly accounted for by the fact of the humid regions it affects being singularly equable in temperature.

Both this and the *V. salignum* would no doubt succeed in our conservatories, on rockwork or pieces of wood, for both occasionally grow on the ground in rocky places in the Himalaya.

PLATE XV. *B.* Fig. 1. Portion of stem and leaves. 2. Pedicel, calyx, and style. 3. Glandular hairs of pedicel. 4. Stamen. 5. Transverse section of ovary:—*all magnified.*

W.Fitch del. et lith.

Vincent Brooks Imp.

A, C. GRACILIS, H.f.&T. B, CODONOPSIS JAVANICA, H.f.&T. C, C. INFLATA, H.f.&T.

PLATE XVI. *A.*

CODONOPSIS (LEPTOCODON) GRACILIS, *H.f. et T.*

Nat. Ord. Campanulaceæ.

Herba gracillima volubilis glauca glaberrima tenella, foliis longe petiolatis ovatis ovato-rotundatisve obtusis grosse crenato-lobatis flaccidis, pedicellis gracilibus plerumque extra-alaribus, calycis tubo obconico, lobis obovatis subdentatis obtusis, corolla tubulosa supra medium ampliata limbo truncato obscure 5-lobo, ovario semisupero glandulis 5 staminibus alternantibus aucto 3-loculari, ovulis paucis dissepimentis adnatis axi remotis, stylo gracili, stigmate trilobo extus hispido, fructu inferne coriaceo supra calycem sicco subchartaceo trivalvi in conum acuminatum producto, seminibus anguste oblongis, testa nitida.

Hab. In sylvis humidis temperatis Himalayæ orientalis: Sikkim, alt. 5–7000 ped. *Fl.* Maio.

Nothing can exceed the beauty and delicacy of this little plant, which is of rare occurrence in Sikkim, inhabiting watercourses in very dense shaded woods, and covering bushes with its pale, translucent, membranous foliage and pale blue flowers. Like all its congeners, it is full of milky juice, and exhales a peculiar strong and very disagreeable odour when bruised, much like that of the Rue in character.

This and the two other species figured with it, are very singular plants, all so closely allied in many important botanical characters that I do not doubt their belonging to one genus, but all presenting such important differences in structural characters that many botanists will doubtless separate them. Thus the present species has flowers that seldom arise from the axils of the leaves, their pedicels being adnate with the stem above them; a half-inferior ovary, with five stipitate glands between the stamens; a membranous corolla, with a tubular base, dilated throat, and slightly expanded truncated limb; a three-celled ovary, with few ovules attached to the dissepiments, but removed from the axis. The fruit is conical, both above and below the calyx, coriaceous below it, dry rather horny and three-valved above it, and the seeds have a polished testa. To this the subgeneric name of *Leptocodon* may be applied, in allusion to the narrow bell-shaped corolla.

In the *C. Javanica* the calyx is wholly inferior, and the corolla superior; the corolla is herbaceous, very broadly campanulate, with five spreading lobes; the ovary has no stipitate glands, is three- to five-celled, with fleshy axillary placentæ projecting into each cell, and covered with ovules; the fruit is a pulpy, truncated, indehiscent berry, and the seeds are covered with a reticulated testa. This belongs to the genus *Campanumœa* of Blume.

In the *C. inflata* the calyx is wholly superior; the corolla ventricose and herbaceous; the ovary has no stipitate glands; the fruit is a fleshy berry, with three horny valves at the summit, as in *C. gracilis*, but the placentation and seeds are as in *C. Javanica*. To the species with flowers constructed upon this type the subgeneric name *Eucodonopsis* may be retained, as it was to these especially that Dr. Wallich applied the name of *Codonopsis* originally.

All the above species agree in their twining habit, milky juice, strong odour when bruised, flower-stalks inserted opposite the petioles or above them, the structure of the styles, stigmata, stamens, and in the peculiar ramification of the young leaf-bearing branches, which often resemble compound leaves. There are, however, other species of the genus which unite the above characters more or less, or present such modifications of them that it is impossible to separate them generically; of these several are erect plants, and two of them tropical, the *C. truncata*, Wall., and *C. parviflora*, Wall., the latter of which is the *Campanumœa Celebica* of Blume, and has the calyx often removed far below the ovary on the pedicel, whilst the corolla is still superior. To these the name *Cyclocodon* has been applied by Griffith, and it may be retained as a subgeneric name. A fourth subgenus, *Glossocomia*, includes all the other known species, which consist of erect alpine plants with terminal flowers, resembling those of *Eucodonopsis* in all essential points.

The genus or group *Codonopsis*, as thus restricted, consists of about fourteen species, inhabiting central and south-eastern Asia, from Soongaria and Afghanistan, the Himalaya, and Tibet, in the extreme north-west, to Bhotan, the Khasia Mountains, and Malayan Peninsula, and two of them being also found in Java. It is unknown in the peninsula of India and Ceylon. One species is perhaps Dahurean and Chinese, if, as is probable, the *Platycodon grandiflorum*, Alph. DC., is referable to it. The genus is further remarkable for its comparatively narrow range in geographical area and wide range in altitude; for species are found at all elevations, from 3000 to 10,000 feet, and in all climates, from very wet to very dry ones.

PLATE XVI. *A*. Fig. 1. Flower with the corolla and stamens removed. 2. Stigma. 3. Pollen-collectors and pollen. 4. Pollen-grains. 5. Transverse section of ovary. 6. Ripe fruit. 7. Seed. 8. Vertical section of ripe fruit. 9. Embryo:—*all magnified.*

PLATE XVI. *B.*

CODONOPSIS (CAMPANUMŒA) JAVANICA, *H.f. et T.*

Nat. Ord. Campanulaceæ.

Herba volubilis glaberrima, foliis oppositis et alternis ovato-cordatis acutis crenatis, pedunculis axillaribus et lateralibus 1-floris, calyce infero alte 5-lobo lobis lineari-oblongis patentibus, corolla supera late campanulata limbo 5-lobo patente, bacca supera subglobosa angulata truncata carnosa evalvi 3–5-loculari, ovulis placentis crassis axillaribus adnatis, seminibus oblongis testa reticulata.

Campanumœa Javanica, *Blume, Bijdr. p.* 276; *Alph. DC. Mon. Camp. p.* 118; *DC. Prodr. v.* 8. *p.* 423.

Hab. In fruticetis Himalayæ orientalis temperatæ et subtropicæ: Sikkim, alt. 5–7000 ped.; necnon in montibus Khasiæ, alt. 5–6000 ped., et in Java. *Fl.* tempore pluvioso.

A very elegant climber, remarkable for its wide range in geographical distribution, the Javanese specimens being identical with the Sikkim ones. The leaves are very variable in shape, especially at the cordate base, the lobes of which have a narrow or broad sinus.

Plate XVI. *B.* Fig. 1. Flower with a portion of the calyx and corolla removed. 2. Nearly ripe fruit. 3. Transverse section of a five-celled; and 4, of a three-celled variety. 5. Seed:—*all magnified.*

PLATE XVI. *C.*

CODONOPSIS (EUCODONOPSIS) INFLATA, *H.f. et T.*

Nat. Ord. CAMPANULACEÆ.

Herba volubilis glaberrima, foliis alternis ovato-cordatis acutis acuminatisve crenatis, pedunculis oppositifoliis 1-floris, calycis tubo acute 10-gono limbo supero, corolla subampullacea 5-loba lobis breviusculis, bacca carnosa 3–5-loculari apice truncata apice valvis 3 incompletis chartaceis dehiscente, seminibus reticulatis.

HAB. In sylvis temperatis Himalayæ orientalis: Sikkim, alt. 5–6000 ped. *Fl.* tempore pluvioso.

This in habit closely resembles the *C. Javanica*, but is a very different plant; like it, the temperature suited to it is easily obtained in any greenhouse where sufficient heat and moisture may be preserved in the summer, which is its flowering season.

PLATE XVI. *C.* Fig. 1. Flower with part of the calyx and corolla removed. 2. Transverse section of ovary. 3. Fruit. 4. Seed:—*all magnified.*

W. Hincks del. et lith.

Vincent Brooks imp.

AESCHYNANTHUS ERIANTHUS, W. & T.

PLATE XVII.

ÆSCHYNANTHES PEELII, *H.f. et T.*

Nat. Ord. CYRTANDRACEÆ.

Epiphytica, 2–3-pedalis, parce ramosa, glaberrima, caulibus teretibus basi lignosis, foliis petiolatis ovatis ovato-lanceolatisve longe acuminatis integerrimis basi rotundatis obtusisve coriaceis, pedunculis terminalibus elongatis apice bifloris bibracteatis, bracteis amplis ovato-lanceolatis acuminatis, floribus pedicellatis, calycis profunde 4-partiti lobis linearioblongis obtusis corolla ter brevioribus.

HAB. In sylvis temperatis Himalayæ orientalis: Sikkim, alt. 5–7500 ped. *Fl.* tempore pluvioso.

This splendid species inhabits a greater elevation and cooler climate than any other known to me. It used to grow on the lofty trees of the Jillapahar, behind Dorjiling, before the forests were so thinned that the situation became too exposed for it. It is at the same time one of the most brilliantly coloured species known, the peduncles, pedicels, bracts, and flowers being of the same vivid red colour, and the leaves a deep glossy green above, and pale beneath. A very similar plant inhabits lower levels on the Khasia mountains, but bears many flowers in each pair of bracts, and has longer narrower leaves; it may, however, be only a variety of this.

PLATE XVII. Fig. 1. Corolla laid open. 2. Pistil. 3. Transverse section of ovary. 4. Capsules. 5. Seeds:—
all (*but fig.* 4) *magnified.*

W. White del. et lith.

Vincent Brooks Imp.

BULBOPHYLLUM COLVILLII, H.f. & T.

PLATE XVIII.

BUDDLEIA COLVILEI, *H.f. et T.*

Nat. Ord. Scrophularineæ.

Frutex v. arbuscula erecta 10-pedalis ramosa, ramis teretibus, ramulis subangulatis, ultimis paniculis foliisque junioribus pubescenti-tomentosis, foliis breve petiolatis lanceolatis acuminatis obscure crenato-serratis, paniculis terminalibus axillaribus et supra-axillaribus pendulis multifloris, bracteolis ad basin pedicellorum subulatis, floribus breve pedicellatis subternis coccineis, calyce hemisphærico breviter 4-dentato tomentoso, corolla calyce 4–5-plo longiore tubuloso-campanulata, tubo cylindraceo, limbo 4-fido lobis amplis patentibus rotundatis eroso-dentatis, capsulis erectis ovato-oblongis acuminatis tomentosis calyce duplo vel triplo longioribus, seminibus testa laxa reticulata 3-alata.

Hab. In sylvis temperatis Himalayæ orientalis: Sikkim, alt. 9–12,000 ped. *Fl.* Jul.

This is very unlike any other Asiatic species of *Buddleia* in its size and form of flower, colour, and the locality it inhabits, its congeners being almost without exception tropical or subtropical plants; in several respects it more closely resembles some of the species of the Andes, but it has no rival anywhere for beauty and graceful habit. It is abundant towards the summit of Tonglo, from 9000 feet to the top (10,000), and is also frequent in the Lachen and Lachoong valleys at similar elevations; even ascending to 12,000 feet.

This will probably prove perfectly hardy, as I have found it in very exposed places as well as in woods; and from the abundance of its flowers and its lasting some weeks in bloom, it would be a most desirable addition to our gardens. The Plate was made from a sketch of my own.

Plate XVIII. Fig. 1. Corolla cut open. 2. Stamens. 3. Pollen. 4. Calyx, ovary, and style. 5. Ovary. 6. Transverse section of ovary. 7. Ovule. 8. Seeds, *natural size*. 9. Seed. 10. Longitudinal section of seed. 11. Albumen, with its coat removed from the testa. 12. Vertical section of ditto. 13. Embryo:—*all but fig.* 8 *magnified.*

W. Fitch del. et lith.

Vincent Brooks Imp.

RHEUM NOBILE, H.f. & T.

PLATE XIX.

RHEUM NOBILE, *H.f. et T.*

Nat. Ord. Polygoneæ.

Herba elata 3–5-pedalis columnaris, radice elongato-fusiformi, rhizomate crasso brevi, caule erecto sulcato simplici bracteis reflexis deorsum imbricatis membranaceis omnino velato, foliis radicalibus rosulatis breve crasse petiolatis ovato-oblongis obtusis integerrimis basi cuneatis nervis flabellatis, caulinis orbiculatis brevius pedicellatis recurvis in bracteis repente desinentibus, bracteis stramineis translucidis convexis bullatis marginibus roseis, stipulis maximis membranaceis rubris, paniculis brevibus axillaribus compositis e basi flabellatim ramosis intra stipulas nidulantibus et bracteis omnino velatis, floribus viridibus pedicellatis, sepalis 6 æqualibus oblongis obtusis, staminibus 6, ovario breviter stipitato compresso v. trigono, stylis 2–4, stigmatibus capitatis, achænio 2–4-alato lateribus tuberculatis.

Hab. In rupibus abruptis alpinis Himalayæ orientalis: Sikkim, alt. 13–15,000 ped. *Fl.* Jun.

The present is certainly the most striking of the many fine alpine plants of Sikkim; and though in every botanical character, as also in the acid juice of the stem, a genuine Rhubarb, it differs so remarkably in habit and general appearance from any of its congeners, that at first sight it could not be recognized as one of them. I first saw it from a distance of fully a mile, dotting the black cliffs of the Lachen valley at 14,000 feet elevation, in inaccessible situations, and was quite at a loss to conceive what it could be; nor was it till I had turned back the curious bracteal leaves and examined the flowers that I was persuaded of its being a true Rhubarb.

The individual plants of *Rheum nobile* are upwards of a yard high, and form conical towers of the most delicate, straw-coloured, shining, semi-transparent, concave, imbricating bracts, the upper of which have pink edges; the large, bright glossy, shining green radical leaves, with red petioles and nerves, forming a broad base to the whole. On turning up the bracts, the beautiful membranous, fragile, pink stipules are seen, like red silver-paper, and within these again the short branched panicles of insignificant green flowers. The root is very long, often many feet, and winds amongst the rocks; it is as thick as the arm, and bright yellow inside. After flowering the stem lengthens, the bracts separate one from another, become coarse red-brown, withered and torn; finally, as the fruit ripens, they fall away, leaving a ragged-looking stem, covered with panicles of deep brown pendulous fruits. In the winter, these naked black stems, projecting from the beetling cliffs, or towering above the snow, are in dismal keeping with the surrounding desolation of that season.

The stems of this plant (called "Chuka" by the inhabitants) are pleasantly acid, and much eaten; the hollow of the stem contains a good deal of limpid water.

The accompanying drawing is taken from a sketch of the whole plant, of the natural size, which I took,

and which covers two folio sheets of paper (that is, four times the area of the Plate). The seeds which I sent to Kew, grew and some of the plants lived two years; they should be planted in peat soil and rockwork, and kept very cool and damp.

PLATE XIX. Fig. 1. Flower. 2. Stamen. 3. Pollen. 4, 5. Ovaria. 6. Vertical section of ovarium. 7. Ovule. 8. Ripe fruit. 9, 10. Transverse sections of ditto. 11. Embryo:—*all magnified.*

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W.Fitch del et lith.

QUERCUS LAMELLOSA, Ham.

Vincent Brooks Imp.

PLATE XX.

QUERCUS LAMELLOSA, *Wall.*

Nat. Ord. CUPULIFERÆ.

Arbor excelsa, trunco 3–5 ped. diametro stricto erecto superne ramoso, coma oblonga, ramis mediocribus, ramulis velutino-tomentosis, foliis amplis coriaceis breve petiolatis elliptico-ovatis lanceolatisve acuminatis grosse argute subspinuloso-serratis multinerviis superne læte viridibus subtus argenteis glaucisve, inflorescentia mascula ignota decidua, fœminea brevi pauciflora spicata, stigmatibus 3 capitatis vix exsertis, involucris maximis subglobosis crassis coriaceis lamellosis lamellis concentricis 10–16 sericeis marginibus fimbriato-ciliatis, superioribus incurvis glandem arcte cingentibus, glande late ovato-oblonga apice sericea, embryone striato.

HAB. In Himalaya centrali et orientali temperata, alt. 5–8000 ped.: Nipal, Sikkim, et Bhotan. *Fl.* vere; *fr.* Nov.

The present is one of the commonest trees about Dorjiling, and is certainly by far the noblest species of Oak known, whether for the size of the foliage or acorns, their texture and colour, or the imposing appearance of the tree, which has a tall, straight, solid trunk, forty to sixty feet high, and an oblong crown as much above it. The leaves are hardly persistent during the winter, though the tree is at no time destitute of foliage: the wood is indifferent. As with our common European forest trees, the fruit is produced in much greater abundance in some seasons than at others; in the winter of 1848-49 it was so abundant that it was dangerous to ride along the roads near Dorjiling, the hard round acorns causing the horses to stumble. Most of these decayed where they fell, nor did any that I sent to England germinate, for the cotyledons are very fleshy, and the plumule sprouts as soon as the acorns are exposed to the heat of the plains. This is, indeed, the case with most of the Indian Oaks, of which there are about thirty species, very few of which have been introduced into this country.

PLATE XX. Fig. 1. Young acorns. 2. An old acorn, cut vertically. 3. Gland. 4. Seed. 5. Transverse section of cotyledons:—*all of the natural size.*

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W. Fitch del. et lith

Vincent Brooks Imp.

LARIX GRIFFITHII, H.f. & T.

PLATE XXI.

LARIX GRIFFITHII, *H.f. et T.*

Nat. Ord. Coniferæ.

Arbor 20–60-pedalis, trunco gracili 1–2 ped. diametro, coma conica, ramis arcuatis apicibus pendulis, ramulis longissimis dependentibus, foliis linearibus, conis masculis oblongo-cylindraceis, antheris subquadrato-orbiculatis unguiculatis connectivo apice eroso-dentato, ungue dilatato, conis fœmineis erectis cylindraceis obtusis, bracteis subulatis elongatis reflexis deorsum imbricatis squamis orbiculatis concavis triplo longioribus, conis maturis 4–5-pollicaribus cylindraceis obtusis, bracteis persistentibus subsquarrosis, seminibus oblongis ala oblonga multoties brevioribus.

Hab. In sylvis temperatis Himalayæ orientalis interioris, alt. 8–12,000 ped.: Nipalia orientali, Sikkim et Bhotan. *Fl.* Maio; *fr.* Oct.

This very distinct and graceful Larch bears the name of its discoverer, Mr. W. Griffith, one of the most active and promising of the many naturalists who have devoted their energies and sacrificed their lives to the pursuit of botany in India. It was Mr. Griffith's wish that his name should be recorded by one of the Himalayan *Coniferæ*, but the species to which he hoped it would have been attached (*P. excelsa*) had been known and named long before he found it. That indefatigable botanist discovered the present species in Western Bhotan, towards the confines of Sikkim; I gathered it abundantly in the interior valleys of Sikkim and Eastern Nipal, and was assured by the natives of the latter country that it prevails as far west as the sources of the Dud Kosi river. It is a remarkable fact that neither this species nor the *Abies Brunoniana* are found on the outer or even central ranges of Sikkim, but only in the interior, though both affect a much lower level than *Abies Webbiana*, which abounds on the outer and central ranges, wherever these attain 10,000 to 11,000 feet elevation.

Larix Griffithii grows to a height of sixty feet in deep valleys, but it prefers the dry, rocky, ancient moraines formed by glaciers that have centuries ago retired to higher levels in the mountains; and it also grows on grassy slopes, where the drainage is good. It is remarkable for its very slender habit, sparse foliage, and very long, lithe, cord-like, pendulous branchlets, that are set in motion by the slightest breeze, and in a heavy gale are so completely blown to one side that the tree appears lop-sided. The erect cones are much larger than those of any hitherto described Larch, and further differ from any others in their numerous scales, and in their long, reflexed, persistent bracts, which are placed at the back of every scale in this species, but which in the others are only seen on the lowest scales of all.

The wood of this tree is soft, white, and very indifferent; it is called Sah, or Saar, by the Lepchas, and also by the Tibetans and Bhoteas. Seeds which I sent to Kew germinated readily, and the young plants are now three to four feet high. Some have withstood the late severe winter (1854-5) with no

protection, whilst others have been quite killed: a difference I am inclined to attribute to some of my seeds having been gathered from plants which grew at 8000 feet, and others at nearly 13,000 feet elevation.

PLATE XXI. *A*. Male branch. *B*. Female branch. Fig. 1, 2, 3. Anthers. 4. Pollen. 5. Young cone. 6, 7, 8. Scales and bracts. 9. Ripe cone. 10, 11. Its scales and bracts. 12. Ripe seeds. 13. The same:—*all* (*but* 5, 9, *and* 12) *more or less magnified.*

J.D.H. anal. W.Fitch del. et lith.

Vincent Brooks Imp.

CYRTOSIA LINDLEYANA H.f.&T.

PLATE XXII.

CYRTOSIA (ERYTHRORCHIS) LINDLEYANA, *H.f. et T.*

Nat. Ord. Orchideæ.

Herba robusta elata aphylla, rhizomate elongato torto fibras crassas simplices tortuosas obtusas emittente, ad nodos squamoso, apice incrassato in caulem erectum 2–3-pedalem solidum desinente, caule glabro cylindraceo basin versus squamato, squamis ovato-oblongis basi lata insertis obtusis, panicula laxe ramosa, ramis paucis horizontalibus basi bracteatis pubescentibus 5–10-floris, floribus spicatis basi bracteolatis, ovario cylindraceo perianthio æquilongo velutino tomentoso, perianthii subglobosi sepalis exterioribus oblongis obtusis velutinis 3–5-costatis v. subalatis costis flexuosis, petalis oblongo-rotundatis margine crispatis, labello ovato-oblongo concavo lateribus erectis v. incurvis marginibus eroso-fimbriatis extus glabro intus barbato subpaleaceo, columna arcuata apice utrinque bidentata glaberrima antice plana, stigmate transverso, anthera conico-oblonga recurva extus papilloso-tuberculata basi biloba biloculari loculis hippocrepiformibus, polliniis 2 hippocrepiformibus cylindraceis laxe granulatis, granulis globosis ternis quaternisve, capsulis magnis pendulis obtuse trigonis primum carnosis demum valvis 3 tarde dehiscentibus, seminibus late alatis.

Pogochilus, *Falconer, MSS.*

Hab. In sylvis temperatis Himalayæ orientalis et montibus Khasiæ, alt. 5–7000 ped. *Fl.* Jul.

The subject of the present Plate is certainly the most remarkable Orchid in the Himalaya, if not in all India, and belongs to a small genus, native of the Eastern Himalaya, the Khasia mountains, and the Malayan Islands. This was established by Blume on a Javanese plant with pulpy indehiscent fruit and wingless seeds, of which two species are figured in his 'Flora Javæ;' since then the same learned author has proposed another generic name (*Erythrorchis*) for an allied plant agreeing with *C. Lindleyi* in having dehiscent fruit and winged seeds. After a careful study of these, however, Dr. Thomson and I have come to the conclusion that the above characters are not of generic importance, being unaccompanied with any differences of habit, and the characters themselves being subject to considerable modification in the several species; thus the fruit of *C. Lindleyana* is very fleshy, and presents no trace of dehiscence until old and dry, when the valves often do not separate wholly, and the breadth of the wing of the seeds is a very variable character in this species, whilst others have much narrower wings.

Though so different in habit, *Cyrtosia* is very nearly allied to *Vanilla*, a genus having a somewhat similar pollen-mass and three-valved fleshy capsule, without the intermediate pieces so conspicuous in the ordinary type of Orchideous fruit. The hairs of the ovarium are branched and cellular. The tissues of the plant abound in a viscid fluid, and are formed of loose cellular tissue, full of oblong and quadrate cells, containing raphides, and traversed by stout woody bundles; the latter are composed of spirally marked tubes, long superimposed cells with dotted walls, very broad tracheæ, and thick-walled woody tubes, with their sides perforated by pores surrounded by discs, much resembling the woody tissue of *Coniferæ*. The three placentæ of the ovary are very broad and slightly convex, studded with innumerable anatropous ovules of

the form and structure common to *Orchideæ*, and along the back of each placenta is a dense mass of white conducting tissue? formed of delicate white, transparent, mucilaginous tubes.

Cyrtosia Lindleyana is not uncommon near Dorjiling. None of the seeds I sent to Calcutta or to England germinated, nor did the roots which I dug up live, either at Dorjiling or Calcutta. I never could trace any parasitic attachment between its roots and those of the other plants with which it grew, nor am I aware that a parasitic attachment has been proved to exist in any Orchid. I have also sought in vain for such in *Listera Nidus-avis*.

The plant is dedicated by Dr. Thomson and myself to our friend Dr. Lindley, who has laboured so long and successfully in investigating the structure and affinities of the extremely difficult Natural Order to which it belongs, and who has kindly undertaken the determination and description of our Indian species for his admirable work the 'Folia Orchidacea.'

PLATE XXII. Fig. 1. Labellum. 2, 3. Front and side view of column. 4. Anther, seen from below. 5. Pollen-mass. 6. Grains of pollen. 7. Transverse section of ovary. 8. Hairs from ovary. 9. Placenta, with conducting tissue? at the back of its lobes. 10. Ovule. 11. Transverse section of ripe capsule. 12. Seed. 13. Seed with the wings and testa removed in front. 14. Cellular tissue of stem, and raphides. 15. Vascular tissue. 16. Cells with raphides:—*all* (*but fig.* 12) *magnified.*

J.W.Etch lith.

VANDA CATHCARTII, Lindley.

PLATE XXIII.

VANDA CATHCARTI, *Lindl.*

Nat. Ord. Orchideæ.

Longe caulescens, foliis lineari-oblongis planis subundulatis apice rotundatis oblique bilobis racemo laxo erecto paucifloro brevioribus, sepalis petalisque oblongis rotundatis sessilibus æqualibus, labello coriaceo basi mutico auriculato, auriculis nanis rotundatis lobo intermedio cordato obtuso margine elevato tomentoso rugoso per axin bicostato ante auriculam carnosissimo.—*Lindl. Fol. Orchid. pt.* 4; *Vanda, p.* 8.

Hab. In vallibus calidis Himalayæ orientalis: Sikkim, alt. 2–4000 ped. *Fl.* Aprili.

Dr. Lindley says of this that "no more remarkable Orchid has been found in Northern India;" and though not so showy as the gorgeous *Dendrobia* (*chrysanthum*, *Devonianum*, *Farmeri*, etc.), amongst which it grows, it exceeds any of these in its singularity, and its chaste elegant appearance. Living specimens which I sent to Calcutta flowered in the Botanical Gardens there, but did not survive the voyage to England.

Plate XXIII. Fig. 1. Ovary, column, and labellum. 2. Front view of column. 3, 4. Pollinia. 5, 6. Anther. 7. Capsule:—*all but fig.* 7 *magnified.*

J.D.Hooker anal. W.Fitch lith

Vincent Brooks Imp.

PARIS POLYPHYLLA, Smith.

PLATE XXIV.

PARIS POLYPHYLLA, *Sm.*

Nat. Ord. SMILACEÆ.

Foliis 4–9 verticillatis sublonge petiolatis lineari- v. oblongo-lanceolatis acuminatis trinerviis basi rotundatis acutisve, flore pedicellato, sepalis 4–6 foliaceis ovato-lanceolatis acuminatis trinerviis, petalis 4–6 filiformibus sepalis brevioribus longioribusve, staminibus 4–10, antheris linearibus filamentis longioribus obtusis v. connectivo subulato producto terminatis, ovario 4–6-loculari 4–6-angulato, stigmatibus divergentibus revolutis, capsula 4–6-valvi, seminibus rubris testa aquosa.

PARIS polyphylla, *Smith in Rees' Cycl.; Don, Prodr. Fl. Nep. p.* 49; *Wall. Plant. As. Rar. v.* 2. *t.* 126; *Kunth, En. Plant. v.* 5. *p.* 118.

HAB. In sylvis temperatis Himalayæ occidentalis centralis et orientalis a Simla ad Bhotan, alt. 6–10,000 ped. *Fl.* Maio.

This very singular plant has been long known to botanists, though never hitherto introduced into this country. It has been supposed to be the same with a Dahurian plant, *P. verticillata*, Bieb., a point I cannot ascertain, for want of sufficient specimens of the latter. The characters by which they have been distinguished depend upon the number of parts of the flower and the relative length of the sepals and petals, characters which vary in every specimen of *P. polyphylla*. In those I have examined of *P. verticillata* and *P. incompleta*, which hardly appears different, the petioles are much shorter.

The specimen I have figured here is by no means the largest I have seen, though I have also found individuals scarcely three inches high. The parts of the flower are excessively variable in number, size, shape, and relative dimension, especially the sepals and petals; the anthers are, moreover, sometimes blunt, and at others have the connective produced into a terminal spur, which invalidates the division of the genus into *Paris* and *Demidovia*, to which latter *P. polyphylla* has been referred, on account of the acuminate anthers.

Mr. Cathcart's drawing differs in the seeds from Wallich's figure, the latter having been drawn from dried specimens, in which the brilliant scarlet pulp had shrunk. The seeds are eaten by the Lepchas: they are sweet, but mawkish.

PLATE XIV. Fig. 1. Petal. 2, 3. Stamens of different varieties. 4. Tissue of anther-cell. 5. Pollen-grains. 6. Ovary. 7. Transverse section of ovary. 8. Ovule. 9. Vertical section of ovule. 10. Section of nucleus, showing the embryo-sac. 11. Ripe fruit. 12. The same viewed from behind. 13. Ripe seed. 14. Vertical section of ripe seed. 15. Section of albumen. 16. Embryo:—*all* (*but fig.* 11 *and* 12) *magnified.*

DR. J. D. HOOKER, F.R.S.

PORTRAIT of DR. HOOKER in the Rhododendron Region of the Himalaya Mountains, surrounded by his native Lepcha collectors, etc. etc., examining the plants gathered during the day's march. *Frank Stone, A.R.A.*

Two officers of his Nepaulese Guard are in attendance, and their Ghoorka Sepoys are seated round a fire in the distance. The scene represents a view taken on the skirts of a pine-forest, at 9000 feet elevation; Kinchin Junga, the loftiest mountain in the world, elevation 28,178 feet, is seen in the distance. The trunk of a tree on the right is covered with *Rhododendron Dalhousiæ*, and other epiphytes.

Extract from Catalogue of the Exhibition of the Royal Academy for 1852.

Mr. Reeve begs to announce that a large handsome engraving of the above Picture, in his possession, has been executed in mezzotint at the suggestion of the friends of Dr. Hooker, at a cost of two hundred guineas for 100 Proof Impressions, of which 60 have been subscribed for at the cost price of £2. 2*s*. each, and that he will be happy to receive the names of Subscribers for the remainder. The favour of an early application is requested.

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